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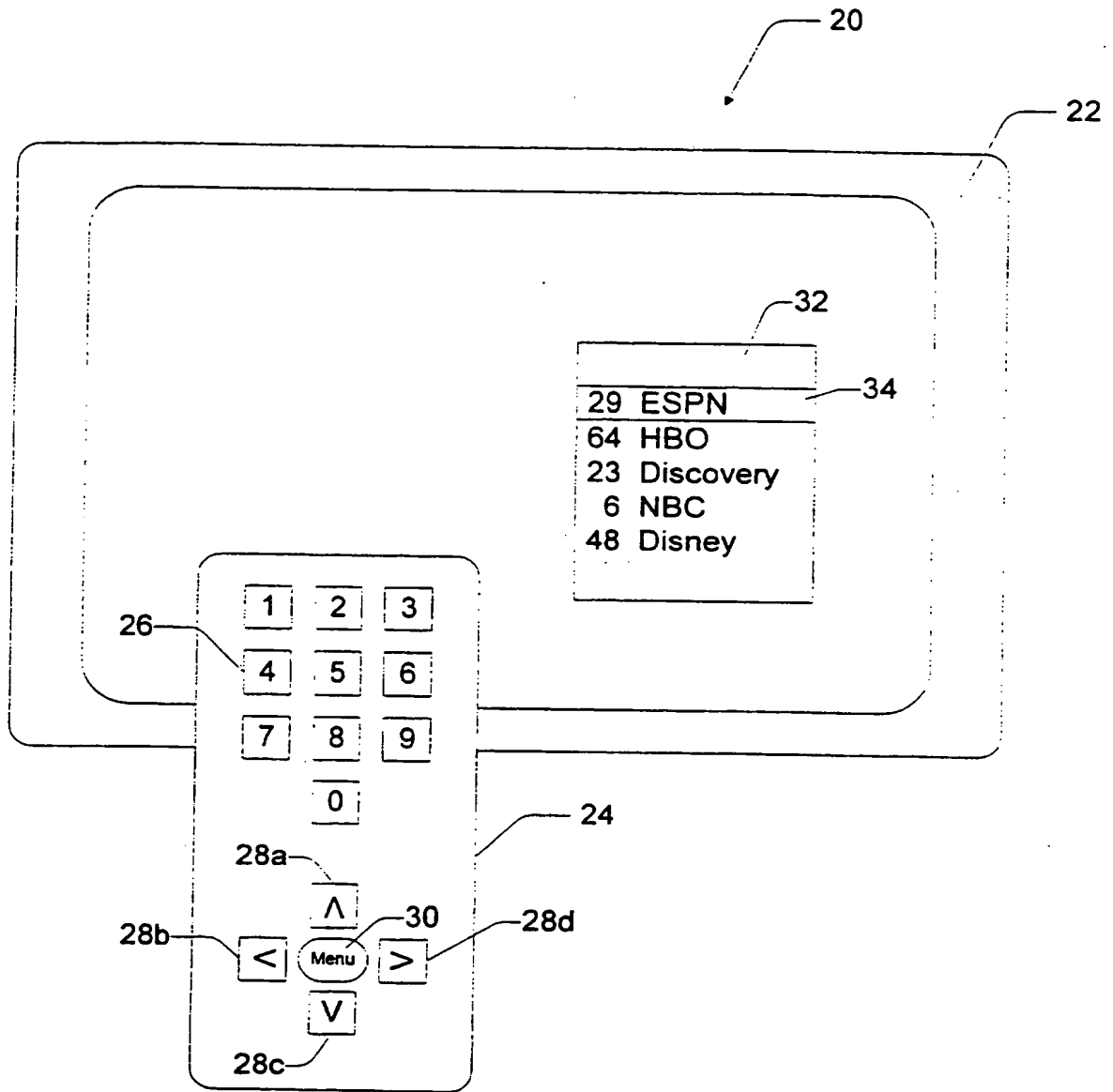


Fig. 1
Prior Art

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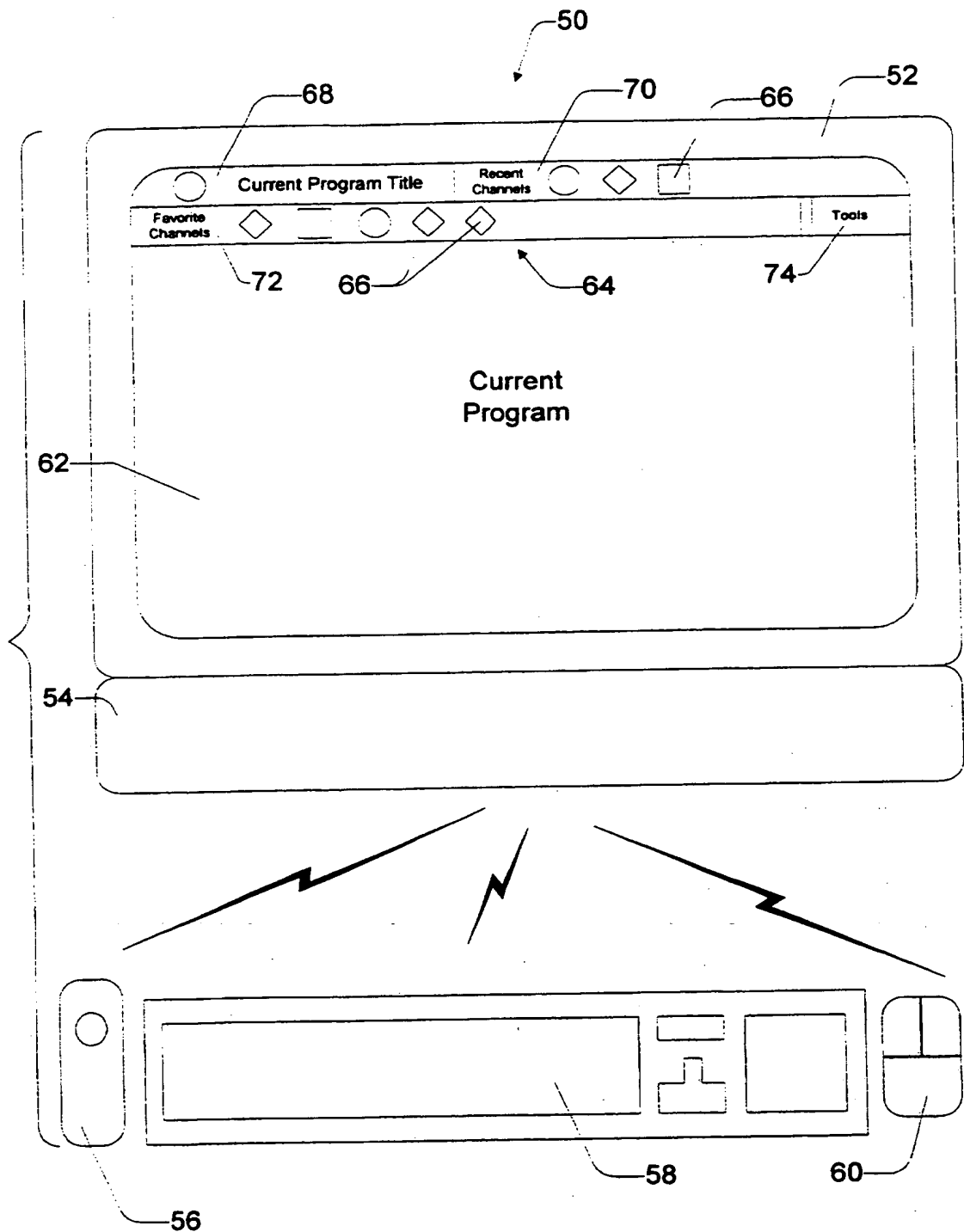


Fig. 2

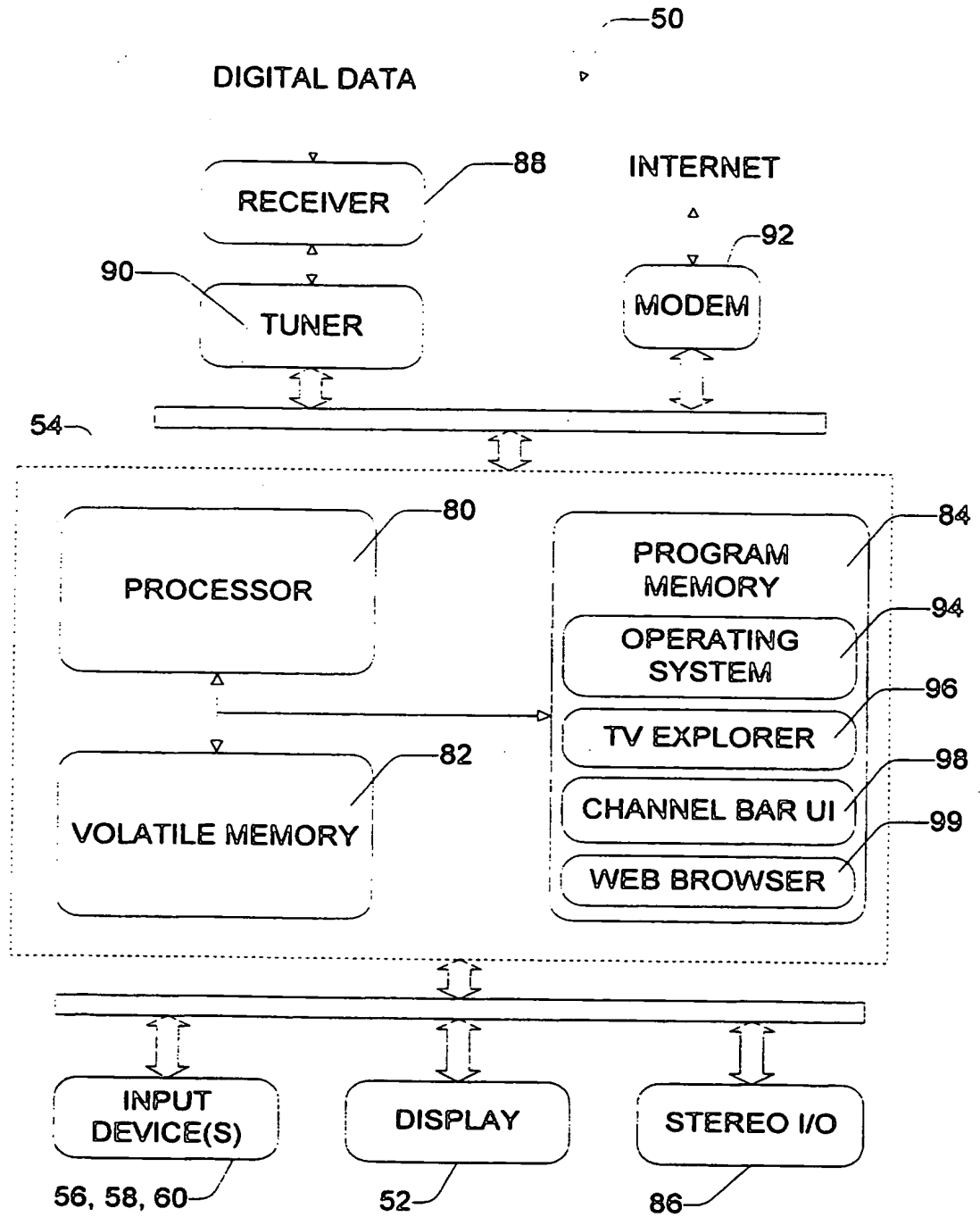


Fig. 3

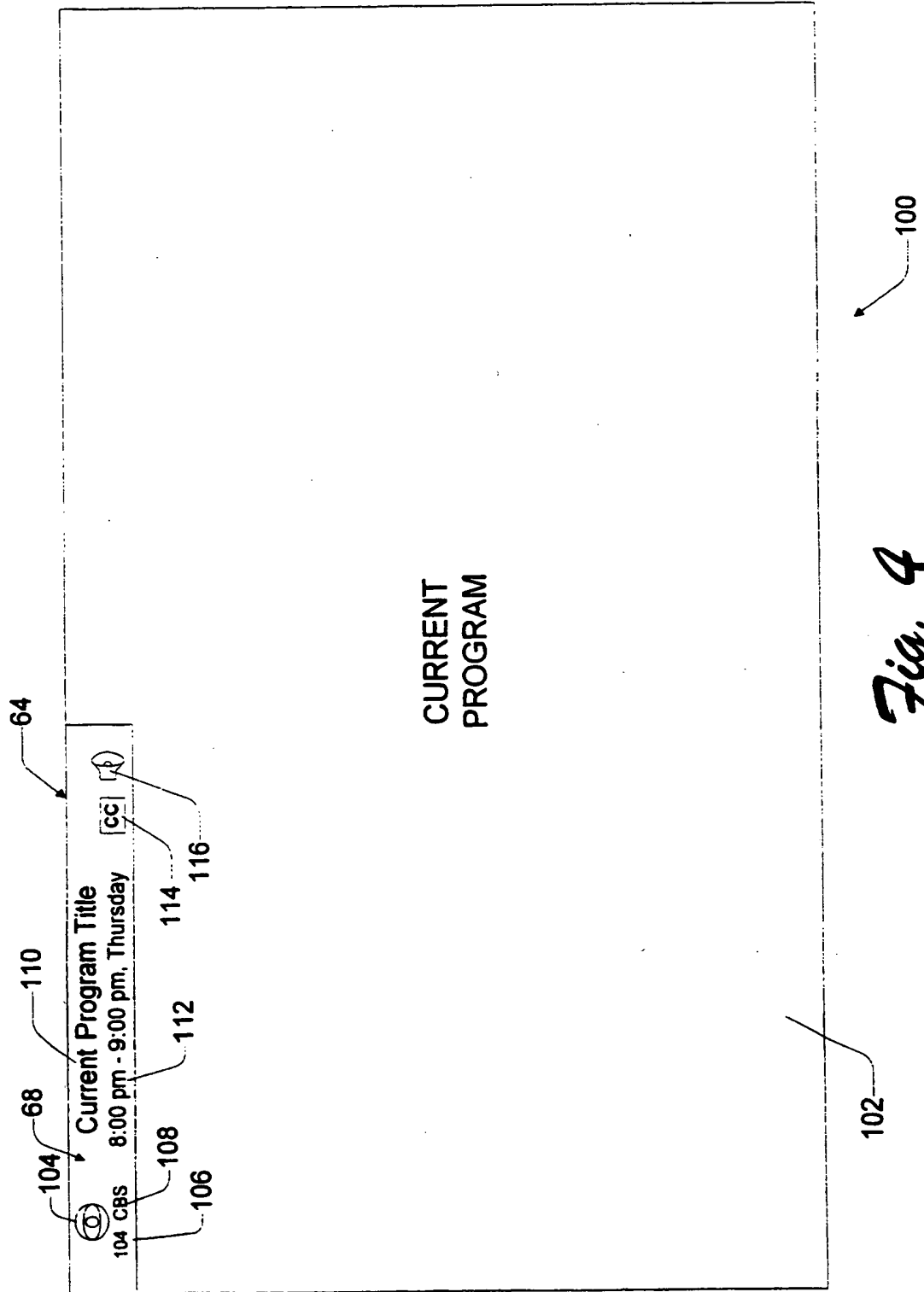


Fig. 4



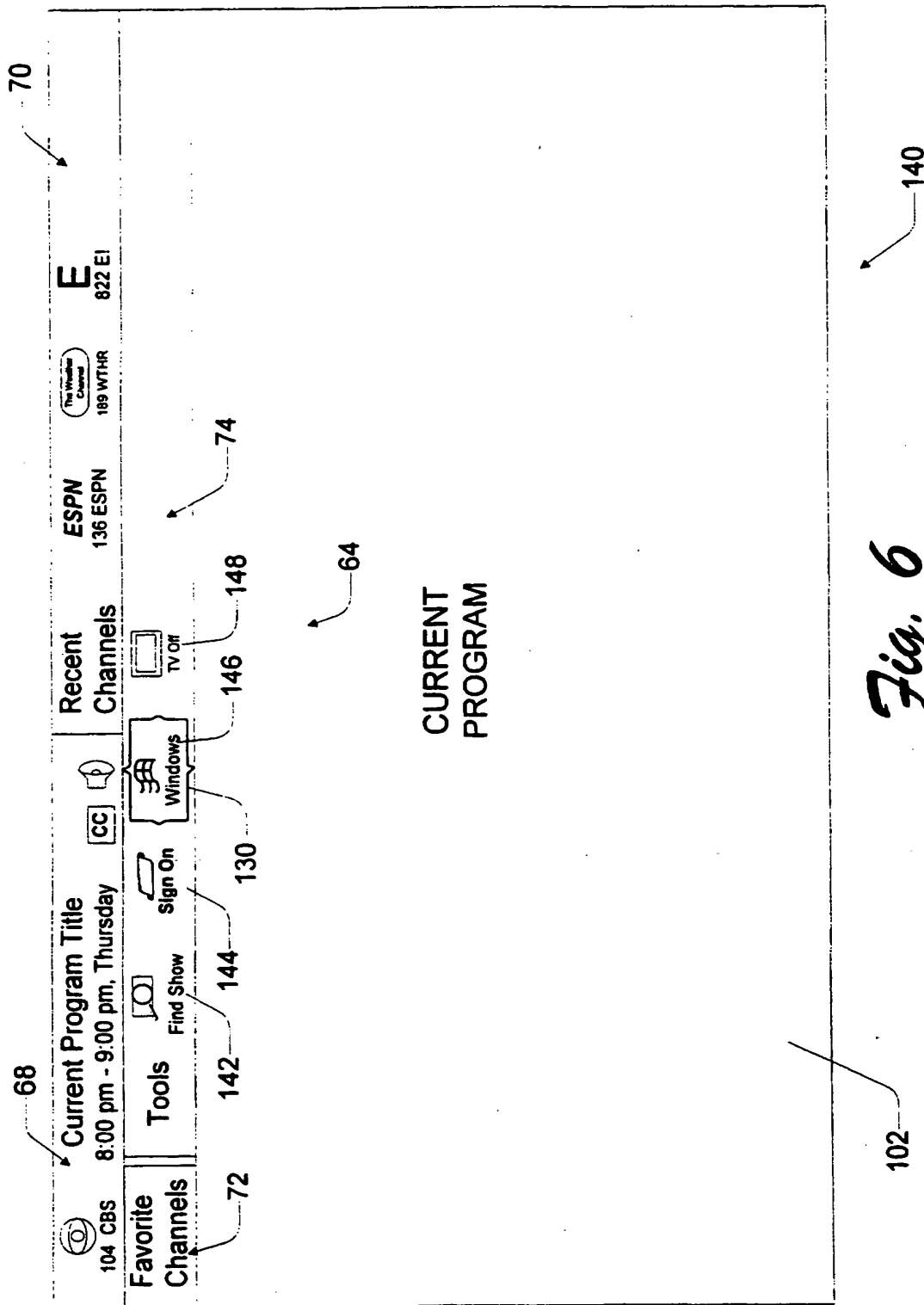
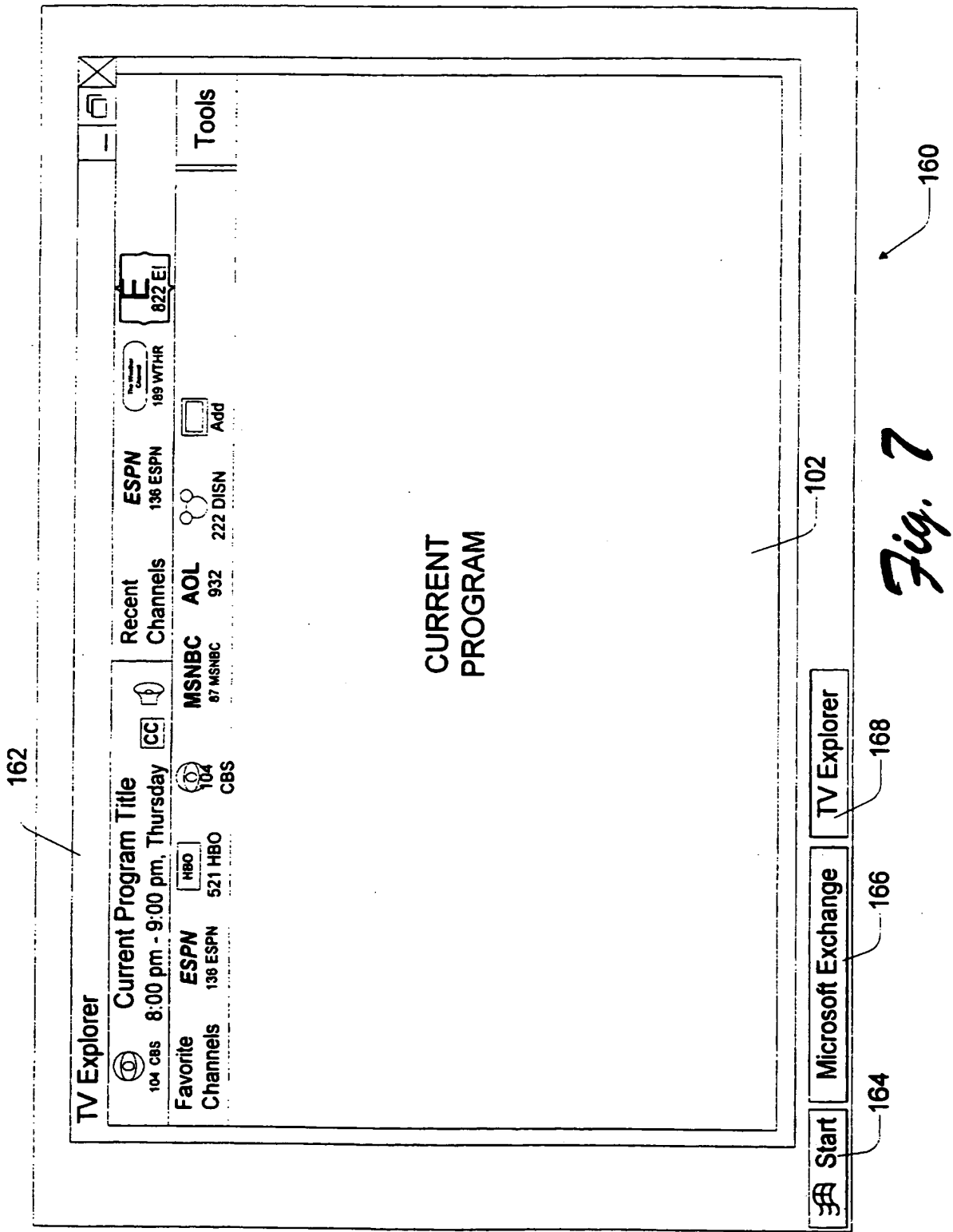


Fig. 6

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TECHNICAL FIELD

This invention relates to entertainment systems in which video programs, such as television shows, are provided over channels. More particularly, this invention relates to a computer-like user interface which assists a viewer in navigating among various channels.

BACKGROUND OF THE INVENTION

Conventional televisions offer very little assistance to a viewer who is navigating among many channels in an effort to locate a desired program or station. The television or cable set top box displays a channel number, but this is often the only information provided to the viewer. Some newer models might also display a network name or logo along with the channel number. Unfortunately, this user interface, although customary, is not particularly useful. Most viewers resort to memorizing their favorite channel numbers and skipping about to these favorite channels.

Memorizing favorite channels is effective when the channel offerings are few and the viewer is accustomed to a single regional television market. However, the number of channels available for viewing on cable or satellite television networks is expected to increase dramatically, with 500 or 1000 channels being commonplace. Today, a viewer may have no difficulty memorizing that the ESPN® Sports Network resides in his/her market on channel 29; but tomorrow, the same viewer might have trouble memorizing that ESPN 1 is on channel 292, ESPN 2 is on channel 564, and ESPN 3 is on channel 1008. Additionally, memorization does little to help the traveling viewer who finds himself or herself in a new market with entirely different channel number and network affiliations.

1 There is a need to improve television user interfaces to better assist viewers
2 when selecting channels. Some progress has been made. Sony Corporation has
3 developed one type of user interface which offers some viewer assistance in
4 selecting favorite channels. Fig. 1 shows a Sony television system 20 having a
5 television 22 and a remote control handset 24. In this example illustration, the
6 handset 24 has a 10-digit numeric keypad 26, a four directional control buttons
7 28a-28d, and a menu button 30 centrally located in the directional control buttons
8 28. Other control buttons might also be included on the handset 24—such as
9 power, volume, VCR shuttle controls, mute, etc.—but are not shown in this
10 illustration.

11 The Sony system 20 provides a user interface in the form of a pop-up menu
12 32 which appears on the television 22 when the viewer depresses the menu button
13 30. The pop-up menu 32 lists five favorite channels of the viewer. A highlight bar
14 34 is initially positioned on the top choice, but can be scrolled over the favorites
15 list using the up/down buttons 28a and 28c. The favorites list is user-configurable,
16 allowing the viewer to define which channels are displayed in the pop-up menu
17 32. With this user interface, a viewer can quickly display his/her top five favorite
18 channels and select the one most appealing at that moment. The user interface
19 alleviates the problem of having to memorize favorite channels.

20 The inventors have developed a new user interface system for assisting a
21 viewer in channel navigation, as well as other control features.
22
23
24
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SUMMARY OF THE INVENTION

This invention concerns a graphical user interface for an entertainment system which assists a viewer while navigating channels. The user interface is a channel bar which is displayed together with the currently selected channel. The channel bar has a plurality of linearly arranged channel-related icons for navigating the channels. A viewer-controllable focus is movable along the channel bar to permit the viewer to select and actuate any one of the icons, causing the entertainment system to jump to the channel associated with the selected icon.

According to one implementation, the entertainment system is a computerized viewing unit which has a processor, memory, and a multitasking operating system. The operating system provides a graphical user interface environment which supports presentation of graphical windows. An application executes on the processor to provide the channel bar user interface (UI). When used in conjunction with television programming, the application sizes the channel bar UI to ensure that it resides in the video safe zone. An input device—such as a mouse, keyboard, remote control handset, etc.—enables the viewer to invoke the channel bar UI and to manipulate the focus along the channel bar.

The channel bar UI includes a banner which contains information pertaining to the presently selected channel. The banner might include, for example, the following information: a channel number, station call letters, a network logo, the name of the program that is presently being played, the program time slot, whether the program is data enhanced, whether the program is in stereo, or whether the program has closed captioning or alternate audio tracks. The banner is displayed by itself, in a corner of the display, when the viewer is channel surfing using channel up/channel down controls on an input device.

1 The channel bar also includes three control bars which are invokable by the
2 viewer by activation of a special button on the remote control, or by utilization of
3 the mouse or keyboard, or by a similar operation. The three control bars are
4 displayed with the banner to present the full channel bar UI. The control bars
5 include a recent channels bar, a favorite channels bar, and a tools bar. The recent
6 channels bar contains linearly-arranged actuatable icons which are associated with
7 channels that have been most recently selected by the viewer. For instance, the
8 recent channels bar shows icons for the three most recently selected channels
9 which are unique (i.e., no one channel is shown twice in the list). Each icon might
10 consist of a network logo, a program logo, a channel number, station call letters, a
11 network name, or a combination of these.

12 The favorite channels bar contains actuatable icons that are associated with
13 those channels most preferred by the viewer. This list of favorites can be viewer
14 configurable, or automatically tabulated based on viewer behavior patterns or
15 other heuristics.

16 The tools bar contains actuatable icons that are associated with control
17 features for operating the entertainment system. For example, the tools bar might
18 contain an icon for facilitating viewer log on, an icon for turning off the
19 entertainment system, and an icon for launching a find dialog box to help the
20 viewer find a particular program or channel. The tools bar also has an icon which
21 permits a viewer to toggle between a television mode, in which programs are
22 displayed full screen, and a windows mode in which the program and channel bar
23 are confined to a window. The windowed program and channel bar can then be
24 controlled by the viewer using conventional windowing controls, such as
25 minimizing the window, re-sizing it, moving it, and so forth. Once in the windows

1 mode, the viewer can launch other applications, such as an e-mail application, or
2 an Internet Web browser, or a conventional computer application (word
3 processing, spreadsheet, financial/banking, etc.), or the like.

4 According to another aspect of this invention, the icons on the channel bar
5 are associated with both channels used to receive traditional television
6 programming (movies, shows, sports, news, etc.) and channels used to access Web
7 sites or other target specifications on the Internet. The channel bar can also be
8 constructed to contain hyperlinks, independent of any associated channel, which
9 allow the user to activate associated target specifications directly from the channel
10 bar.

11 **BRIEF DESCRIPTION OF THE DRAWINGS**

12 Fig. 1 is a diagrammatic illustration of a prior art television system which
13 utilizes a pop-up menu to present a predetermined list of favorite channels to assist
14 a viewer in choosing a possible channel for viewing.

15 Fig. 2 is a diagrammatic illustration of a viewer computing unit according
16 to one implementation of this invention.

17 Fig. 3 is a block diagram of the viewer computing unit.

18 Fig. 4 is an exemplary screen illustration of a channel bar graphical user
19 interface (UI) that is displayed when a viewer is changing channels.

20 Fig. 5 is an exemplary screen illustration of the channel bar UI when the
21 viewer requests full navigation assistance.

22 Fig. 6 is an exemplary screen illustration of the channel bar UI when the
23 viewer invokes a tools bar portion of the UI.
24
25

1 Fig. 7 is an exemplary screen illustration showing a windows mode of
2 operation.

3 4 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

5 Fig. 2 shows a viewer computing unit 50 constructed according to one
6 implementation of this invention. The viewer computing unit 50 is embodied as a
7 broadcast-enabled personal computer (PC) having tuner equipment installed
8 therein to receive the video data, such as conventional television broadcast signals.
9 The viewer computing unit 50 includes a display 52, a central processing unit
10 (CPU) 54 (which is shown separately, but may be incorporated into the display
11 casing), and various input devices such as a remote control handset 56, a remote
12 keyboard 58, and a remote mouse 60. Each of the input devices are coupled to the
13 CPU 54 via a wireless data link, such as an IR (infrared) link or an RF (radio
14 frequency) link; although the keyboard and mouse can be coupled using traditional
15 serial cables.

16 The broadcast-enabled PC is only one example implementation, and many
17 are possible. One alternative implementation is a computer-enhanced television
18 set having a processor, memory, and an operating system. Another
19 implementation might be a television with a built in Web browser for Internet
20 access, commonly referred to as a "Web television" or "Internet television."
21 Another implementation might be a television with a set-top box (STB).

22 The viewer computing unit 50 shows a conventional video program 62 on
23 the display 52 in the same or similar manner as conventional television. The video
24 program 62 can be a TV show, a movie, news, sports, or other video program.
25 Signals received from an antenna, cable headend, satellite, or other receiver are

1 converted to pixel data and displayed on the screen. The viewer computing unit
2 50 runs a TV explorer application to control how the program 62 is displayed.
3 The TV explorer application also provides a helpful user interface to assist the
4 viewer in navigating among the channels.

5 As shown in Fig. 2, the TV explorer application provides a graphical user
6 interface (UI) configured as a channel bar 64 arranged along the top periphery of
7 the video frame. The channel bar 64 is typically hidden from view while the
8 viewer is watching the program 62. The channel bar appears when the viewer
9 activates buttons on one of the input devices 56-60. The channel bar 64 has
10 multiple channel-related icons 66 which are associated with the channels used to
11 receive the programs. The icons are linearly arranged in a horizontal region or
12 "bar." Different horizontal bars identify different groupings of icons which relate
13 to different features. In the illustrated implementation, the channel bar 64
14 comprises a banner 68 and three control bars—a recent channels bar 70, a favorite
15 channels bar 72, and a tools bar 74. The channel bar user interface is described
16 below in more detail with reference to Figs. 4-6.

17 Fig. 3 shows an entertainment system in the form of a viewer computing
18 unit 50 embodied as a broadcast-enabled computer. The central processing unit 54
19 has a processor 80 (e.g., x86 or Pentium® microprocessor from Intel Corporation),
20 volatile memory 82 (e.g., RAM), and program memory 84 (e.g., ROM, Flash, disk
21 drive, floppy disk drive, CD-ROM, etc.). The viewer computing unit 50 has one
22 or more input devices 56-60 (e.g., keyboard, mouse, etc.), a computer display 52
23 (e.g., VGA, SVGA), and a stereo I/O 86 for interfacing with a stereo system.

24 The viewer computing unit 50 includes a digital broadcast receiver 88 (e.g.,
25 satellite dish receiver, RF receiver, microwave receiver, multicast listener, etc.)

1 and a tuner 90 which tunes to appropriate frequencies of a wireless distribution
2 network or addresses of a broadcast network. The tuner 90 is configured to
3 receive digital broadcast data in a particularized format, such as MPEG-encoded
4 digital video and audio data, as well as digital data in many different forms,
5 including software programs and programming information in the form of data
6 files, as well as analog video and audio data. The viewer computing unit 50 also
7 has a modem 92 which provides dial-up access to the Internet or other data
8 network. In other implementations of a back channel, the modem 92 might be
9 replaced by a network card, or an RF transceiver, or other the like which provides
10 access to the data network.

11 The viewer computing unit 50 runs an operating system 94 which supports
12 multiple applications. The operating system 94 is stored in program memory 84
13 and is loaded into volatile memory 82 for execution on processor 80 when the
14 entertainment system is booted. The operating system 94 is preferably a
15 multitasking operating system which allows simultaneous execution of multiple
16 applications. The operating system employs a graphical user interface windowing
17 environment which presents the applications or documents in specially delineated
18 areas of the display screen called "windows." One preferred operating system is a
19 Windows® brand operating system sold by Microsoft Corporation, such as
20 Windows® CE, or Windows® 95, or Windows® NT or other derivative versions
21 of Windows®. It is noted, however, that other operating systems which provide
22 windowing environments may be employed, such as the Macintosh operating
23 system from Apple Computer, Inc. and the OS/2 operating system from IBM.

24 One example implementation of a broadcast-enabled PC is described in a
25 co-pending U.S. Patent Application Serial No. 08/503,055, entitled "Broadcast-

1 Enabled Personal Computer," filed January 29, 1996 in the names of Gabe L.
2 Newell, Dan Newell, Steven J. Fluegel, David S. Byrne, Whitney McCleary,
3 James O. Robarts, Brian K. Moran; William B. McCormick, T.K. Backman,
4 Kenneth J. Birdwell, Joseph S. Robinson, Alonzo Gariepy, Marc W. Whitman,
5 and Larry Brader. This application is assigned to Microsoft Corporation, and is
6 incorporated herein by reference.

7 The viewer computing unit 50 has a television explorer application 96
8 stored in memory 84 and executable on the processor 80. The TV explorer
9 application 96 controls how the program is displayed on the display 52. For this
10 implementation, the TV explorer application enables television-like viewing on a
11 computer. During normal viewing, the TV explorer application 96 executes in
12 background, with its user interface hidden from the viewer, and the television
13 show or other video program is shown in full screen. When the viewer enters a
14 command with an input device (e.g., channel up, channel down, entry of new
15 channel number, etc.), the TV explorer application presents the channel bar
16 graphical user interface on the display along with the video program. The channel
17 bar UI is preferably implemented as a DLL (dynamic linked library) 98, which is
18 stored in memory 84 and is callable by the TV explorer application 96.
19 Alternatively, in systems designed more exclusively for television viewing (e.g., a
20 Web television, TV with set top box, etc.), the channel bar UI might be
21 implemented as part of the operating system tailored for that machine. The viewer
22 computing unit 50 also has a Web browser 99 stored in memory 84 and executable
23 on the processor 80 to render hypermedia documents received from target
24 resources on the Internet.
25

1 Figs. 4-6 show example display screens with various graphical
2 constructions of the channel bar UI taken during different operating conditions.
3 Fig. 4 shows a screen 100 when the viewer is engaged in routine channel changing
4 (or "surfing") using channel up, channel down, or digit entry on an input device,
5 or when using direct channel selection via an electronic programming guide
6 (EPG). During such operation, the channel bar UI 64 presents only the banner 68
7 which provides information pertaining to the presently selected channel.

8 The banner 68 is positioned at the top, left hand corner of the video frame,
9 partially overlaying a current program 102. The banner 68 displays information
10 about the currently displayed program 102, such as a network or channel logo 104
11 (e.g., CBS "eye"), a channel number 106 (e.g., channel "104"), network or channel
12 call letters 108 (e.g., CBS), a title of the program 110, and a program time slot
13 112. The banner 68 might also include information pertaining to available
14 viewing features, as represented by the closed captioning icon 114 and the audio
15 track icon 116. Other possible features include program rating, whether stereo or
16 surround sound is available, whether the program is data enhanced, whether the
17 show is a new episode or a rerun, and the like. Additionally, the banner 68 might
18 display icons invoked by other applications, such as a mailed letter icon that is
19 shown when the viewer receives an e-mail message.

20 The information used to construct the banner 68 may be supplied
21 periodically from the content provider to the viewer computing unit and stored
22 therein. The information might alternatively be supplied as part of the program
23 feed; for instance, in the first ten lines of the VBI (vertical blanking interval)
24 which is reserved for data. Another potential source of data is from an EPG
25 application that is loaded on the viewer computing unit.

1 The banner 68 is updated immediately as the viewer changes the channel.
2 In the event that the viewer enters a new channel number, digit-by-digit, using the
3 remote control handset or keyboard, the banner 68 temporarily shows each digit as
4 it is entered. Upon recognizing the digits entered as a channel number, or a
5 network name, or a station's call letters, the viewer computing unit tunes to the
6 designated channel and the banner 68 reflects the appropriate program
7 information. The banner 68 remains visible for a predetermined time period, and
8 is then removed following continued viewer inactivity.

9 Fig. 5 shows a screen 120 when the viewer specifically invokes the full
10 channel bar UI. The viewer requests the full channel bar UI 64 by depressing a
11 menu key on the remote control handset, or by moving a mouse pointer to the top
12 of the screen, or by some other designated command. The full channel bar UI 64
13 resides along the top of the video frame, and may partially overlies the video
14 program 102.

15 According to one possible implementation, the TV explorer application
16 presents the channel bar UI 64 and the video frame 102 within an HTML
17 (Hypertext Markup Language) page. HTML is a subset of "SGML" (Standard
18 Generalized Markup Language) which is a language for document representation
19 that formalizes markup and frees it of system and processing dependencies on the
20 language. Hypermedia content utilized by the World Wide Web (or WWW or
21 Web) is commonly written in a "markup language" such as SGML, or more
22 particularly HTML. With an HTML format, the TV explorer application can size
23 the video frame to a certain dimensions, and place the channel bar 64 as a border
24 about the video frame. In this manner, the TV explorer application ensures that
25

1 the channel bar is written only in the video safe zone, and not in the
2 underscan/overscan regions about the video safe zone.

3 The full channel bar UI 64 comprises the banner 68, the recent channels bar
4 70, the favorite channels bar 72, and the tools bar 74. The banner 68 is identical to
5 that described above with reference to Fig. 4. The channel bar UI may be
6 presented in one or more regions on the screen. In the illustrated implementation,
7 the banner 68, recent channels bar 70, the favorite channels bar 72, and the tools
8 bar 74 are arranged across the top of the screen. In an alternative configuration,
9 the individual bars may be displayed in disjoint regions, such as placing the banner
10 68 at the top of the screen and having the bars 70-74 located at a different region
11 of the screen (e.g., extending from the right side, midway down of the screen).

12 The recent channels bar 70 contains multiple linearly arranged, actuatable
13 icons 120 that are associated with channels that have been most recently selected
14 by the viewer. In this illustration, the recent channels bar 70 shows three unique
15 channel icons related to the most recently watched channels: ESPN on channel
16 136, The Weather Channel on channel 189, and E! on channel 822. No channel
17 icon is duplicated on the list, and the channel icon for the current program is not
18 included on the list. The channel-related icons 66 are listed sequentially from
19 most recently viewed (i.e., ESPN on channel 136) to least recently viewed (i.e., E!
20 on channel 822). Selection of these recent channel-related icons 120 permits the
21 viewer to quickly switch among the most recently watched channels, without
22 requiring the viewer to remember and enter the channel or station number each
23 time he/she wishes to switch.

24 The favorite channels bar 72 contains multiple, linearly arrayed, actuatable
25 icons 122 that are associated with channels most preferred by the viewer. The

1 favorite channels bar 72 is located beneath the banner 68 and recent channels bar
2 70 in a horizontal region. In this example, the favorite channels bar 72 shows six
3 channel icons related to the viewer's most favorite channels: ESPN on channel
4 136, HBO on channel 521, CBS on channel 104, MSNBC on channel 87,
5 American Online (AOL) on channel 932, and the Disney Channel on channel 222.
6 Notice that five of these icons correspond to channels for television programs (i.e.,
7 ESPN, HBO, CBS, MSNBC, DISN) which includes traditional broadcast
8 channels, cable channels, premiere channels, and so forth. The sixth icon,
9 referenced as number 124, corresponds to a channel for a Web site (i.e., AOL) on
10 the Internet.

11 According to an aspect of this invention, the channel bar is capable of
12 supporting both icons for television channels, and icons for channels that deliver
13 target specifications on a data network, such as the Internet. There is an increasing
14 convergence between content available on traditional cable and broadcast TV and
15 the content provided over the Internet. The number of TV- and movie-related
16 Web sites are rapidly increasing. For instance, computer users can access a
17 MSNBC Web site for recent news in addition to, or in lieu of, tuning their
18 televisions to the MSNBC cable channel. As this convergence continues, the
19 source of material will become less important or noticeable to the viewer.

20 In the Fig. 5 example, the AOL icon 124 indicates that the AOL Web site is
21 available on channel 932. To the viewer, there is no differentiation among TV-
22 related icons and Internet-related icons. This is advantageous because the viewer
23 can use the same user interface to switch to a TV channel or to a Web site. It is
24 noted that this Internet-related icon can be found in the recent channels bar 70 (if
25 recently selected), and appear in the banner 68 when active.

1 The TV explorer application executing on the viewer computing unit 50
2 accommodates the various selections. When the viewer selects a TV channel icon,
3 the viewer computing unit 50 tunes to the selected channel and begins displaying
4 the program. When the viewer activates an Internet channel icon, the viewer
5 computing unit 50 launches an Internet Web browser, such as the Internet
6 Explorer from Microsoft Corporation, to load the American Online® home page.
7 As Internet services progress and intertwine with television distribution, the AOL
8 might actually be carried on a real channel, as opposed to a virtual channel derived
9 for viewer interfacing.

10 According to another aspect of this invention, the channel bar UI 64
11 supports raw *hyperlinks* that can be displayed to the viewer. Associated with a
12 hyperlink is an underlying target specification. The target specification is
13 normally invisible to the user and unambiguously identifies a targeted document or
14 resource, typically specifying the name of the computer on which the document
15 resides and the complete file name of the document. In WWW documents, targets
16 are specified using "universal resource locators" (URLs). A URL describes
17 everything about a particular resource that a Web browser needs to know to
18 request and render it. The URL describes the protocol that a browser uses to
19 retrieve the resource, the name of the computer it is on, and the path and file name
20 of the resource.

21 In this illustration, a hyperlink 126 is placed in the favorite channels bar 72.
22 The hyperlink 126 has an associated URL "http://www.schwab.com" to a Web site
23 for the financial services company Charles Schwab & Co. The "http://" portion of
24 the URL describes the protocol, with the letters "http" standing for HyperText
25 Transfer Protocol, a set of rules that a browser follows to request a document and a

1 remote server follows to supply the document. The "www.schab.com" portion of
2 the URL is the name of the remote host computer which maintains the Schwab
3 Web site. When the viewer activates the hyperlink "Schwab," the viewer
4 computing unit 50 launches the Web browser 99 to render the target resource
5 addressed by the URL. The hypertext document is retrieved over the Internet via
6 the modem and supplied to the viewer computing unit.

7 Hypertext usage is not limited to the Internet. The target resources
8 referenced by the hyperlinks might alternatively be located locally. For instance,
9 the system might pre-cache supplemental information about certain shows before
10 they air based on predictive viewing tendencies, or as part of a promotional data
11 broadcast advertising the show. Additionally, various multimedia applications
12 utilize hypertext to allow users to navigate through different pieces of information
13 content. For instance, an encyclopedia program might use hyperlinks to provide
14 cross-references to related articles within an electronic encyclopedia. The same
15 program might also use hyperlinks to specify remote information resources such
16 as WWW documents located on different computers.

17 In concept, the target of a hyperlink can be virtually any type of object—
18 including executable programs, text or multimedia documents, sound clips, audio
19 segments, still images, computers, directories, and other hyperlinks. In WWW
20 documents, hyperlink targets are most often files that can reside on any computers
21 connected to the Internet. However, a hyperlink target can also be a particular
22 location within a document, including the document that is currently being
23 rendered.

24 According to another aspect of this invention, the channel bar may contain
25 one or more icons (not shown) to peripheral media devices, such as a video

1 cassette recorder (VCR) or a digital video disk (DVD) player. Typically, these
2 devices can be mapped to unused channels. The channel bar UI can then assign
3 icons representative of the VCR or DVD player which, upon activation, tune the
4 viewing unit to the channel associated with the VCR or DVD player. The VCR or
5 DVD icons are treated as other channel-related icons, and can appear in the recent
6 channels bar 70 or the favorite channels bar 72.

7 A focus 130 is movable along the channel bar 64 (and in this illustration,
8 the recent channels bar 70) to highlight different icons. The focus 130 is shown as
9 a frame that borders the selected icon. The focus may be implemented in a
10 number of ways, such as changing the icon color when selected, displaying an
11 animated rectangle around the icon, or visually elevating a selected icon to appear
12 more in the foreground, enlarging a selected icon, and the like. Additionally, the
13 focus might be implemented as a pointer, such as those commonly used in
14 personal computers. Still another possible implementation of the focus 130 is that
15 of a tip pointer, in which a pointer identifies an icon and a text box is currently
16 displayed adjacent to the pointer to offer a description of the icon being referenced
17 by the pointer. Such a text box may contain dynamically changing information
18 about the icon; for example, if a favorite channel icon is selected, the text box may
19 display the name of the program currently showing on that channel.

20 The viewer moves the focus 130 along the channel bar 64 using one of the
21 input devices (e.g., actuating the directional pad or keys on a remote control
22 handset, depressing the arrow keys on a keyboard, or manipulating the mouse).
23 The focus can be configured to slide icon-by-icon, or to permit free selection of
24 any icon without regard to positional order, such as by using a mouse pointer or
25 the like. Once the focus is positioned on a selected icon, the icon is activated by

1 clicking a mouse key, or hitting the enter key on the keyboard, or depressing an
2 action key on the remote control handset, or the like.

3 The channels represented in the favorite channels bar 72 are initially set at
4 the time of sale. For instance, the manufacturer or retailer might set the favorites
5 list to a set of predetermined channels for the corresponding television market.
6 Alternately, the channels may be set based on selections (involving demographic
7 information, genre preferences, and the like) made by the viewer during an initial
8 configuration phase. After purchase, the viewer can reconfigure the channels
9 through a simple menu interface which allows the viewer to add or remove icons.
10 In the Fig. 5 illustration, an add icon 132 is provided as part of the favorite
11 channels bar 72 to facilitate adding a new channel. When the viewer is watching a
12 favorite channel (i.e., a Web site, premium channel, or regular channel), the
13 viewer activates the add icon 132 and the viewer computing unit immediately
14 creates an icon representing the currently displayed channel. This icon then
15 becomes a part of the favorite channels bar 72 and provides a short cut back to the
16 channel at any time. If space in the favorite channels bar is limited, the least
17 favorite channel icon may be removed with the addition of a new favorites icon.

18 As an alternative, the icons listed in the favorites channels bar 72 might be
19 developed based on viewer usage patterns. For example, the viewer computing
20 unit 50 might automatically monitor "hits" on each channel and list in priority the
21 icons associated with the channels accumulating the highest number of hits. Other
22 heuristics may be used.

23 It is noted that the channel-related icons 120 and 122 displayed in the
24 recent channels bar 70 and the favorite channels bar 72 are formed of three
25 elements: a network or channel logo (e.g., CBS "eye"), a channel number (e.g.,

1 channel "104"), and network or channel call letters (e.g., CBS). In other
2 implementations, the icons may be implemented with only one or two of these
3 elements. Furthermore, an icon might be a different symbol created by the viewer
4 which represents a particular channel, such as a "football" icon to represent ESPN
5 or a "snowflake" icon to represent the Weather Channel. Essentially, a channel
6 related icon can be any symbol, word, number, or combination, which is
7 associated with a particular channel.

8 With reference again to Fig. 5, the tools bar 74 is shown in a collapsed state
9 to conserve precious screen space in the channel bar region. When the viewer
10 activates this small region, the tools bar 74 expands across the favorite channels
11 bar 72 to reveal the icons in the tools bar.

12 Fig. 6 shows a screen 140 with the tools bar 74 expanded to a full bar state.
13 The tools bar 74 contains actuatable icons 142-148 which control operation of the
14 viewer computing unit 50. In this example, the tools bar 74 lists a "Find Show"
15 icon 142, a "Sign On" icon 144, a "Windows" icon 146, and a "TV off" icon 148.
16 The "Find Show" icon 142 launches a find dialog box which permits a viewer to
17 enter letters or numbers in search of a channel, a program, a network, a particular
18 subject matter, or the like. The "Sign On" icon 144 enables viewers to initially log
19 onto the entertainment system. This icon is activated when a viewer first turns on
20 the system and involves a password or key challenge to restrict viewing to
21 authorized viewers. Additionally, requiring viewer identification through log on
22 procedures enables different viewer permission levels, such as restricting junior
23 family members from viewing certain channels. The "TV off" icon 148 initiates a
24 shut down sequence to terminate operation of the computer viewing unit.
25

1 The "Windows" icon 146 allows a viewer to transition between a full
2 screen mode of operation and windows mode of operation. During normal
3 viewing, the television signals are displayed within a full screen frame. The
4 channel bar, when visible, is overlaid along the top periphery of the frame. When
5 the viewer activates the "Windows" icon 146, the TV explorer application
6 becomes a windowed application on the screen with the television signals and
7 channel bar being constrained within a graphical window.

8 Fig. 7 shows a screen 160 during the windows mode of operation. Here,
9 the traditional television screen is converted to a computer-like screen in which the
10 TV explorer application is constrained within an active window 162. The display
11 screen takes on a look and feel of a user interface common to computers users
12 with Windows® operating systems. The "Start" menu button 164 and other soft
13 buttons 166 and 168 to active programs are displayed along the bottom task bar.
14 In this mode, the viewer can use the viewer computing unit as a conventional
15 personal computer to launch other applications, such as e-mail, word processing,
16 spreadsheet applications, or games. The TV explorer application is itself a
17 windowed program which can be minimized, resized, and reshaped according to
18 the viewer's likes, while maintaining a standard television aspect ratio of four
19 units horizontal to three units vertical, or 16 units horizontal to nine units vertical,
20 in the case of "letterbox" television viewing.

21 The invention has been described in language more or less specific as to
22 structure and method features. It is to be understood, however, that the invention
23 is not limited to the specific features described, since the means herein disclosed
24 comprise exemplary forms of putting the invention into effect. The invention is,
25 therefore, claimed in any of its forms or modifications within the proper scope of

1 the appended claims appropriately interpreted in accordance with the doctrine of
2 equivalents and other applicable judicial doctrines.
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CLAIMS

1. In an entertainment system capable of receiving video signals from multiple channels and displaying the video signals on a display within a video frame, a user interface comprising a graphical channel bar which contains a plurality of linearly arranged channel-related icons for navigating the channels, the channel bar being concurrently presented on the display along with the video frame when the UI is invoked so that a viewer can select and actuate one of the icons on the channel bar to cause the entertainment system to tune to a particular channel related to the actuated icon.

2. A user interface as recited in claim 1, wherein the channel bar is presented as one ore more regions on the display and is one of (1) all regions of the channel bar are situated outside of the video frame, (2) some regions of the channel bar are situated outside of the video frame while other regions of the channel bar are overlaid on a portion of the video frame, or (3) all regions are overlaid on a portion of the video frame.

3. A user interface as recited in claim 1, wherein the channel bar comprises a banner to identify which channel is presently selected.

1 4. A user interface as recited in claim 3, wherein the banner contains
2 indicia selected from a group of indicia comprising a network logo, channel
3 number, call letters, a title of a program carried on the present channel, a program
4 time slot, whether the program supports closed captioning, audio track data,
5 program rating, whether the program supports stereo or surround sound, whether
6 the program is data enhanced, whether the show is a new episode or a rerun, and
7 icons invoked by other applications.

8
9 5. A user interface as recited in claim 1, wherein the channel bar
10 comprises a favorite channels bar which contains actuatable icons associated with
11 channels that are preferred by a viewer so that the viewer can actuate one of the
12 icons on the favorite channels bar to jump to the associated channel.

13
14 6. A user interface as recited in claim 1, wherein the channel bar
15 comprises a recent channels bar which contains actuatable icons associated with
16 channels that have been most recently selected so that a viewer can actuate one of
17 the icons on the recent channels bar to jump to the associated channel.

18
19 7. A user interface as recited in claim 1, wherein the channel bar
20 comprises a tools bar which contains actuatable icons for controlling operation of
21 the entertainment device.
22
23
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1 8. A user interface as recited in claim 1, wherein the icons on the
2 channel bar correspond to channels for television programs and to channels for
3 target specifications on a data network.

4
5 9. A user interface as recited in claim 1, wherein at least one icon on the
6 channel bar corresponds to a channel designated for playing a peripheral media
7 device.

8
9 10. A user interface as recited in claim 1, wherein the channel bar
10 contains one or more hyperlinks to an executable program.

11
12 11. A user interface as recited in claim 1, wherein the channel bar
13 contains one or more hyperlinks to target resources.

14
15 12. A user interface as recited in claim 1, wherein the channel bar
16 comprises:

17 a banner to identify which channel is presently selected;

18 a recent channels bar which contains actuatable icons associated with
19 channels that have been most recently selected;

20 a favorite channels bar which contains actuatable icons associated with
21 channels that are preferred by a viewer; and

22 a tools bar which contains actuatable icons for controlling operation of the
23 entertainment device.

1 13. A user interface as recited in claim 12, wherein the banner and
2 recent channels bar are positioned side-by-side on a first horizontal level and the
3 favorite channels bar is positioned beneath the banner and recent channels bar in a
4 second horizontal level.

5
6 14. A user interface as recited in claim 12, wherein the banner is
7 positioned on one region of the screen and the recent channels bar, the favorites
8 channels bar, and the tools bar are positioned in a different region of the screen.

9
10 15. A user interface as recited in claim 12, wherein the banner, the
11 recent channels bar, the favorites channels bar, and the tools bar are positionable
12 in different regions of the screen.

13
14 16. A user interface as recited in claim 12, wherein one of the recent
15 channels bar, the favorite channels bar, or the tools bar are alternately collapsible
16 and expandable to conserve space in the channel bar.

17
18 17. A user interface as recited in claim 1, further comprising a focus
19 which is movable along the channel bar for selection and actuation of individual
20 ones of the icons.

21
22 18. A computer-readable medium which stores an operating system
23 having computer-executable instructions for operating an entertainment device,
24 the operating system incorporating the channel bar UI as recited in claim 1.
25

1 19. In an entertainment system capable of receiving video signals from
2 multiple channels and displaying the video signals on a display within a video
3 frame, the entertainment device having a processor which executes an invokable
4 channel bar user interface (UI), the channel bar UI comprising:

5 a banner to identify which channel is presently selected; and

6 at least one control bar which contains a plurality of linearly arranged
7 channel-related icons for navigating the channels.

8
9 20. A channel bar UI as recited in claim 19, wherein the control bar
10 comprises a recent channels bar which contains actuatable icons associated with
11 channels that have been most recently selected.

12
13 21. A channel bar UI as recited in claim 19, wherein the control bar
14 comprises a favorite channels bar which contains actuatable icons associated with
15 channels that are preferred by a viewer.

16
17 22. A channel bar UI as recited in claim 21, further comprising means
18 for enabling a viewer to select which channels appear in the favorite channels bar.

19
20 23. A channel bar UI as recited in claim 21, further comprising means
21 for automatically choosing one or more channels for the favorite channels bar
22 based on viewer viewing patterns.

1 24. A channel bar UI as recited in claim 19, wherein the control bar
2 comprises a tools bar which contains actuatable icons for controlling operation of
3 the entertainment device.

4
5 25. A computer-readable medium which stores an operating system
6 having computer-executable instructions for operating an entertainment device,
7 the operating system incorporating the channel bar UI as recited in claim 19.

8
9 26. In an entertainment system capable of receiving video signals from
10 multiple channels and displaying the video signals on a display within a video
11 frame, a channel bar user interface (UI) which contains a plurality of linearly
12 arranged channel-related icons for navigating the channels, the channel bar UI
13 depicting at least one actuatable hyperlink to an object.

14
15 27. A channel bar UI as recited in claim 26, wherein the hyperlink is to
16 a target resource on a data network.

17
18 28. A channel bar UI as recited in claim 26, wherein the hyperlink is to
19 an executable program.

20
21 29. A computer-readable medium which stores an operating system
22 having computer-executable instructions for operating an entertainment device,
23 the operating system incorporating the channel bar UI as recited in claim 26.

1 30. In an entertainment system capable of receiving television signals
2 and displaying the television signals within a display frame on a display, and in
3 which the entertainment system has a memory, a processor, and an operating
4 system executing on the processor to provide a graphical user interface
5 environment which supports presentation of at least one graphical window on the
6 display, a computer-executable application stored in the memory and executable
7 on the processor to control presentation of the television signals on the display, the
8 computer-executable application containing computer-executable instructions for
9 performing the following steps:

10 displaying the television signals within the display frame during a first
11 mode of operation;

12 displaying the television signals within a graphical window during a second
13 mode of operation; and

14 displaying a channel bar along with the television signals, the channel bar
15 having a plurality of linearly arranged channel-related icons which, upon
16 actuation, cause the entertainment system to change channels to receive different
17 television signals, the channel bar further having a windows icon which, upon
18 actuation, converts between the first and second mode of operation.

19
20 31. The computer-executable application as recited in claim 30, further
21 comprising computer-executable instructions for performing the step of restricting
22 the sizing of the graphical window in the second mode of operation to maintain a
23 predefined aspect ratio.

1 32. The computer-executable application as recited in claim 30, further
2 comprising computer-executable instructions for performing the step of sizing the
3 channel bar for depiction within one of the display frame or the graphical window.
4

5 33. The computer-executable application as recited in claim 30, further
6 comprising computer-executable instructions for performing the step of
7 displaying, within the channel bar, actuatable hyperlinks to target resources on a
8 data network.
9

10 34. The computer-executable application as recited in claim 30, further
11 comprising computer-executable instructions for removing the channel bar after a
12 viewer selects an icon.
13

14 35. In an entertainment system which can receive television programs
15 from multiple channels, a method for operating the entertainment system
16 comprising the following steps:

17 displaying a television program from one of the channels; and

18 selectively displaying a channel bar in conjunction with the television
19 program, the channel bar having a plurality of linearly arranged channel-related
20 icons which are associated with other channels.
21

22 36. A method as recited in claim 35, further comprising the step of
23 removing the channel bar after a viewer selects an icon.
24
25

1 37. A method as recited in claim 35, further comprising the step of
2 displaying a focus which is movable along the channel bar for selection and
3 actuation of individual ones of the icons.

4
5 38. A method as recited in claim 35, further comprising the step of
6 displaying hyperlinks to target resources on a data network as part of the channel
7 bar.

8
9 39. A method as recited in claim 35, further comprising the step of
10 displaying TV-channel icons which are associated with channels carrying the
11 television programs and non-TV-channel icons which are associated with channels
12 that do not carry television programs.

13
14 40. A viewer computing unit programmed to perform the steps recited
15 in claim 35.

16
17 41. A computer readable medium which directs a computer to perform
18 the steps recited in claim 35.

19
20 42. A viewer computing unit for depicting television programs on a
21 display, comprising:

22 a processor;

23 an operating system executing on the processor to provide a graphical user
24 interface environment which supports presentation of at least one graphical
25 window on the display;

1 a television explorer application executable on the processor to provide a
2 user interface helpful to a viewer to select among channels carrying the television
3 programs, the user interface (UI) being configured as a channel bar having a
4 plurality of channel-related icons which are associated the channels; and

5 an input device operable in conjunction with the operating system to enable
6 a viewer to select one of the icons on the channel bar.

7
8 43. A viewer computing unit as recited in claim 42, wherein the
9 television explorer application facilitates conversion between a full screen mode in
10 which a television program is displayed in full screen on the display and a
11 windows mode in which the television program is displayed within a graphical
12 window according to a predefined aspect ratio.

13
14 44. A viewer computing unit as recited in claim 42, wherein the channel
15 bar comprises a banner to identify which channel is presently selected.

16
17 45. A viewer computing unit as recited in claim 42, wherein the channel
18 bar comprises a favorite channels bar which contains actuatable icons associated
19 with channels that are preferred by a viewer so that the viewer can actuate one of
20 the icons on the favorite channels bar to jump to the associated channel.

1 46. A viewer computing unit as recited in claim 42, wherein the channel
2 bar comprises a recent channels bar which contains actuatable icons associated
3 with channels that have been most recently selected so that a viewer can actuate
4 one of the icons on the recent channels bar to jump to the associated channel.

5
6 47. A viewer computing unit as recited in claim 42, wherein the channel
7 bar comprises a tools bar which contains actuatable icons for controlling operation
8 of the entertainment device.

9
10 48. A viewer computing unit as recited in claim 42, wherein the icons
11 on the channel bar correspond to channels for television programs and to channels
12 for target specifications on a data network.

13
14 49. A viewer computing unit as recited in claim 42, wherein the channel
15 bar contains one or more hyperlinks to target resources.



Application No: GB 9805688.0
Claims searched: 1-4,19-24

Examiner: D. Midgley
Date of search: 12 June 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): H3Q QLCA,QLCX

Int CI (Ed.6): H04N 5/445

Other: ONLINE:INSPEC,JAPIO,WPI

Documents considered to be relevant:

32

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Claims searched: 1-4,19-24

Examiner: D. Midgley
Date of search: 12 June 1998

Category	Identity of document and relevant passage	Relevant to claims
X,A	EP 0721253 A2 (SONY) See, for example, figure 14A	1,2,5,7,17,18,35,36,37,40,41,42 and 47 at least (X).
"	US 5589893 (ZENITH) See, for example, figure 4	1,19,26,30,35,42(A). 1,2,7,17,18,35,36,37,40,41,42 and 47 at least (X).
"	US 5416535 (SONY) See, for example, figure 26a	1,19,26,30,35,42(A). 1,2,7,17,18,30,31,32,34,35,36,37,40,41,42 and 47 at least (X).

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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